Michael E. Zimmerman, J. Baird Callicott, George Sessions, Karen J. Warren, and John Clark, eds. *Environmental Philosophy: From Animal Rights to Radical Ecology, 2*nd ed. Upper Saddle River, NJ: Prentice Hall, 1998. Pages 124-144.

Challenges in Environmental Ethics

Holmes Rolston III

Holmes Rolston III is professor of philosophy at Colorado State University. He is the author of Philosophy Gone Wild: Essays in Environmental Ethics *and* Environmental Ethics: Duties to and Values in the Natural World.

Ethicists had settled on at least one conclusion as ethics became modern in Darwin's century: that the moral has nothing to do with the natural. To argue otherwise commits the naturalistic fallacy, moving without justification from what *is* in nature *ought to be* in culture. Science describes natural history, natural law; ethics prescribes human conduct, moral law; and to confuse the two makes a category mistake. Nature simply *is,* without objective value; the preferences of human subjects establish value; and these human values, appropriately considered, generate human duties. Only humans are ethical subjects and only humans are ethical objects. Nature is amoral; the moral community is interhuman.

In the last third of this century, unsettled as we enter the next millennium, there is foreboding revolution. Only the human species contains moral agents, but perhaps conscience on such an earth ought not be used to exempt every other form of life from consideration, with the resulting paradox that the sole moral species acts only in its collective self-interest toward all the rest. There is something overspecialized about an ethic, held by the dominant class of *Homo sapiens,* that regards the welfare of only one of several million species as an object and beneficiary of duty. We need an interspecific ethics. Whatever ought to be in culture, this biological world that *is* also *ought to be;* we must argue from the natural to the moral.

If this requires a paradigm change about the sorts of things to which duty can attach, so much the worse for those humanistic ethics no longer functioning in, nor suited to, their changing environment. The anthropocentrism

This essay was originally prepared for an American Philosophical Association symposium on Rolston's book, *Environmental Ethics.* A revised version appears in *Ecology, Economics, Ethics: The Broken Circle* (Yale University Press, New Haven, London, 1991).

associated with them was fiction anyway. There is something Newtonian, not yet Einsteinian, besides something morally naive, about living in a reference frame where one species takes itself as absolute and values everything else relative to its utility. If true to their specific epithet, ought not *Homo sapiens* value this host of life as something with a claim to care in its own right? Man may be the only measurer of things, but is man the only measure of things? The challenge of environmental ethics is a principled attempt to redefine the boundaries of ethical obligation.

Still there is the sense of anomaly that forebodes paradigm overthrow. An ecological conscience? Sometimes this seems to be a category mistake, joining a scientific adjective with an ethical noun, rather like Christian biochemistry mismatches a religious adjective and a scientific noun. With analysis, we suspect that the relation is three-place. Person A has a duty to person B concerning the environment C, and no one has ever denied that natural things have instrumental value to humans. Humans are helped or hurt by the condition of their environment, and we have duties to humans that concern their valuable environment, an environment they are able to value. So conservatives may shrink back into the persistent refusal of philosophers to think biologically, to naturalize ethics in the deep sense. They will fear that it is logically incoherent to suppose there is a nonanthropogenic value, or that this is too metaphysically speculative ever to be operational and that it does not make any pragmatic difference anyway, claiming that an adequate environmental ethic can be anthropogenic, even anthropocentric.

When we face up to the crisis, however, we undergo a more direct moral encounter. Environmental ethics is not a muddle; it is an invitation to moral development. All ethics seeks an appropriate respect for life, but respect for human life is only a subset of respect for all life. What ethics is about, in the end, is seeing outside your own sector of self-interest, of class interest. A comprehensive ethic will find values in and duties to the natural world. The vitality of ethics depends on our knowing what is really vital, and there will be found the intersection of value and duty. An ecological conscience requires an unprecedented mix of science and conscience, of biology and ethics.

1. HIGHER ANIMALS

We have direct encounters with life that has eyes, at least where our gaze is returned by something that itself has a concerned outlook. The relation is two-place: I-thou, subject to subject. Compared with concern about soil and water, which are instrumentally vital but blind, when we meet the higher animals there is somebody there behind the fur and feathers. "The environment" is external to us all, but where there is inwardness in this environment, perhaps we ought to be conscious of other consciousness. Whatever matters to animals, matters morally.

Wild animals defend their own lives, because they have a good of their own. Animals hunt and howl, seek shelter, build nests and sing, care for their young, flee from threats, grow hungry, thirsty, hot, tired, excited, sleepy, seek out their habitats and mates. They suffer injury and lick their wounds. They can know security and fear, endurance and fatigue, comfort and pain. When they figure out their helps and hurts in the environment, they do not make man the measure of things at all; more, man is not the only measurer of things.

Still, man is the only moral measurer of things, and how should he count these wild, nonmoral things? One might expect classical ethics to have sifted well an ethics for animals. Our ancestors did not think about endangered species, ecosystems, acid rain, or the ozone layer, but they lived in closer association with wild and domestic animals than do we. Nevertheless, until recently, the scientific, humanistic centuries since the so-called Enlightenment have not been sensitive ones for animals. Animals were mindless, living matter; biology was mechanistic. Even psychology, rather than defending animal experience, was behaviorist. Philosophy, as we have already said, thought man the measure of things. Across several centuries of hard science and humanist ethics there has been little compassion for animals. We eat millions of them every year and we use many millions more in industry and research, as though little matters unless it matters to humans,

So far as we got ethically, we rather oddly said that we should be humane toward nonhuman animals. "The question is not," said Bentham, "Can they reason, nor Can they talk? but, Can they suffer?" These nonhumans do not share with humans the capacity to reason or talk, but they do share the capacity to suffer, and human ethics can be extended so far forth to our animal cousins. We may be unsure about insects and fish, but at least we will need an avian and a mammal ethics.

The progress of recent science itself has increasingly smeared the human-nonhuman boundary line. Animal anatomy, biochemistry, perception, cognition, experience, behavior, and evolutionary history are kin to our own. Animals have no immortal souls, but then persons may not either, or beings with souls may not be the only kind that count morally. Ethical progress further smeared the boundary. Sensual pleasures are a good thing, ethics should be egalitarian nonarbitrary, nondiscriminatory. There are ample scientific grounds that animals enjoy pleasures and suffer pains; and ethically no grounds to value these in humans and not in animals. The *is* in nature and the *ought* in ethics are not so far apart after all. We should treat animals humanely, that is, treat animals equally with ourselves where they have equal interests.

Recently, then, there has been a vigorous reassessment of human duties to sentient life. More has been written on this subject in the past fifteen years than in the previous fifteen centuries. The world cheered in the fall of 1988 when humans rescued two whales from the winter ice. A sign in Rocky Mountain National Park enjoins humans not to harass bighorn sheep: "Respect their right to life." We have passed animal welfare legislation and set up animal care

committees in our universities. We have made a vital breakthrough past humans, and the first lesson in environmental ethics has been learned.

But the risk of ethical inadequacy here lies in a moral extension that expands rights as far as mammals and not much further, a psychologically based ethic that counts only felt experience. We respect life in our nonhuman but near-human animal cousins, a semi-anthropic and still quite subjective ethics. Justice remains a concern for just-us subjects. Extending our human ethics, we say that the sheep, too, have rights and that we should be humane to the whales. There has, in fact, not been much theoretical breakthrough, no paradigm shift. We do not yet have a biologically based ethics.

We certainly need an ethic for animals, but that is only one level of concern in a comprehensive environmental ethics. When we try to use culturally extended rights and psychologically based utilities to protect the flora or even the insentient fauna, to protect endangered species or ecosystems, we can only stammer. Indeed, we get lost trying to protect bighorns, because in the wild the cougar is not respecting the rights or utilities of the sheep she slays. There are no rights in the wild, and nature is indifferent to the welfare of particular animals. Further, in culture, humans slay sheep and eat them regularly, while humans have every right not to be eaten by either humans or cougars.

A bison fell through the ice into a river in Yellowstone Park; the environmental ethic there, letting nature take its course, forbade would-be rescuers from either saving or mercy killing the suffering animal. A drowning human would have been saved at once. It was as vital to the struggling bison as to any human to get out; the poor thing froze to death that night. Was the Yellowstone ethic callous to life, inhumane? Or had it other vitalities to consider? This ethic seems rather to have concluded that a moral extension is too nondiscriminating; we are unable to separate an ethics for humans from an ethics for wildlife. To treat wild animals with compassion learned in culture does not appreciate their wildness,

Man, said Socrates, is the political animal; humans maximally are what they are in culture, where the natural selection pressures (impressively productive in ecosystems) are relaxed without detriment to the species *Homo sapiens*, and indeed with great benefit to its member persons. Wild and even domestic animals cannot enter culture; they do not have that capacity. They cannot acquire language at sufficient levels to take part in culture; they cannot make their clothing, or build fires, much less read books or receive an education.

Worse, cultural protection can work to their detriment; with too much human or humane care their wildness is made over into a human artifact, A cow does not have the integrity of a deer, a poodle that of a wolf. Culture is a good thing for humans, often a bad thing for animals. Culture does make a relevant ethical difference, and environmental ethics has different criteria from interhuman ethics.

Can they talk? and, Can they reason?, indicating cultural capacities, are relevant questions, not just, Can they suffer? Compassionate respect for life in

its suffering is only part of the analysis. Sometimes in an environmental ethic we do need to follow nature, and not so much to treat animals humanely, like we do humans, as to treat animals naturally, for what they are by themselves. Even when we treat them humanely within culture, part of the ethic may also involve treating them naturally.

"Equality" is a positive word in ethics, "discriminatory" a pejorative one. On the other hand, simplistic reduction is a failing in the philosophy of science and epistemology; to be "discriminating" is desirable in logic and value theory. Something about treating humans as equals with bighorns and cougars seems to "reduce" humans to merely animal levels of value, a "no more" counterpart in ethics of the "nothing but" fallacy often met in science. Humans are "nothing but" naked apes. Something about treating sheep and cougars as the equals of humans seems to elevate them unnaturally, unable to value them for what they are. There is something insufficiently discriminating in such judgments—species blind in a bad sense, blind to the real differences between species, valuational differences that do count morally. To the contrary, a discriminating ethicist will insist on preserving the differing richness of valuational complexity, wherever found.

Two tests of discrimination are pain and diet. It might be thought that pain is a bad thing, whether in nature or culture. Perhaps when dealing with humans in culture, additional levels of value and utility must be protected by conferring rights that do not exist in the wild, but meanwhile at least we should minimize animal suffering. That is indeed a worthy imperative in culture where animals are removed from nature and bred, but it may be misguided where animals remain in ecosystems. When the bighorn sheep of Yellowstone caught pinkeye—blinded, injured, and starving in result—300 bighorns, over half the herd, perished. Wildlife veterinarians wanted to treat the disease, as they would have in any domestic herd, and as they did with Colorado bighorns infected with an introduced lungworm, but the Yellowstone ethicists left them to suffer, seemingly not respecting their life, Had they no mercy? Was this again inhumane?

They knew rather that, while intrinsic pain is a bad thing whether in humans or in sheep, pain in ecosystems is instrumental pain, through which the sheep are naturally selected for a more satisfactory adaptive fit. Pain in a medically skilled culture is pointless, once the alarm to health is sounded, but pain operates functionally in bighorns in their niche, even after it becomes no longer in the interests of the pained individuals. To have interfered in the interests of the blinded sheep would have weakened the species. The question, Can they suffer? is not as simple as Bentham thought. What we *ought* to do depends on what *is.* The *is* of nature differs significantly from the *is* of culture, even when similar suffering is present in both.

Some ethicists will insist that at least in culture we can minimize animal pain, and that will constrain our diet. There is predation in nature; humans evolved as omnivores. But humans, the only moral animals, should refuse to participate in the meat-eating phase of their ecology, just as they refuse to live

merely by the rules of natural selection. Humans do not look to the behavior of wild animals as an ethical guide in other matters (marriage, truth telling, promise keeping, justice, charity). There they do not follow nature. Why should they justify their dietary habits by watching what animals do?

But the difference is that these other matters are affairs of culture; these are person-to-person events, not events at all in spontaneous nature. By contrast, eating is omnipresent in wild nature; humans eat because they are in nature, not because they are in culture. Eating animals is not an event between persons, but is a human-to-animal event; and the rules for this come from the ecosystems in which humans evolved and which they have no duty to remake. We must eat to live; nature absolutely requires that. We evolved to eat as omnivores; that animal nature underruns over human nature. Even in culture meat eating is still relatively natural; there is nothing immoral about fitting into one's ecology. We follow nature, treat animals naturally, capture nutritional values, and learn our place in the scheme of life and death. This respects life, profoundly so. Humans, then, can model their dietary habits from their ecosystems, though they cannot and should not so model their interpersonal justice or charity. When eating they ought to minimize animal suffering, and they also may gladly affirm their ecology. The boundary between animals and humans has not been rubbed out after all; only what was a boundary line has been smeared into a boundary zone. We have discovered that animals count morally, though we are only beginning to solve the challenge of how to count them.

2. ORGANISMS

In college zoology I did an experiment on nutrition in rats, to see how they grew with and without vitamins. When the experiment was completed, I was told to take the rats out and drown them. I felt squeamish but did it. In college botany I did an experiment on seedlings to test how they grew with this or that fertilizer. The experiment over, I threw out the seedlings without a second thought. While there can be ethics about sentient animals, after that perhaps ethics is over. Respect for life ends somewhere in zoology; it is not part of botany. No consciousness, no conscience. Without sentience, ethics is nonsense.

Or do we want an ethic that is more objective about life? In Yosemite National Park for almost a century humans entertained themselves by driving through a tunnel cut in a giant sequoia. Two decades ago the Wawona tree, weakened by the cut, blew down in a storm. People said: Cut us another drive-through sequoia. The Yosemite environmental ethic, deepening over the years, said no! You ought not to mutilate majestic sequoias for amusement. Respect their life! Indeed, some ethicists count the value of redwoods so highly that they will spike redwoods, lest they be cut. In the Rawah Wilderness in alpine Colorado, old signs read, "Please leave the flowers for others to enjoy," When they rotted out, the new signs urged a less humanist ethic: "Let the flowers live!"

But trees and flowers cannot care, so why should we? We are not considering animals that are close kin, nor can they suffer or experience anything. There are no humane societies for plants. Plants are not valuers with preferences that can be satisfied or frustrated. It seems odd to claim that plants need our sympathy, odd to ask that we should consider their point of view. They have no subjective life, only objective life.

Fishermen in Atlantic coastal estuaries and bays toss beer bottles overboard, a convenient way to dispose of trash. On the bottom, small crabs, attracted by the residual beer, make their way inside the bottles and become trapped, unable to get enough foothold on the slick glass neck to work their way out. They starve slowly. Then one dead crab becomes bait for the next victim, an indefinitely resetting trap! Are those bottle traps of ethical concern, after fishermen have been warned about this effect? Or is the whole thing out of sight, out of mind, with crabs too mindless to care about? Should sensitive fishermen pack their bottle trash back to shore—whether or not crabs have much, or any, felt experience?

Flowers and sequoias live; they ought to live. Crabs have value out of sight, out of mind. Afraid of the naturalistic fallacy, conservative ethicists will say that people should enjoy letting flowers live or that it is silly to cut drive-through sequoias, aesthetically more excellent for humans to appreciate both for what they are. The crabs are out of sight, but not really out of mind; humans value them at a distance. But these ethically conservative reasons really do not understand what biological conservation is in the deepest sense. Nothing matters to a tree, but much is *vital*

An organism is a spontaneous, self-maintaining system, sustaining and reproducing itself, executing its program, making a way through the world, checking against performance by means of responsive capacities with which to measure success. It can reckon with vicissitudes, opportunities, and adversities that the world presents. Something more than physical causes, even when less than sentience, is operating within every organism. There is *information* superintending the causes; without it the organism would collapse into a sand heap. This information is a modern equivalent of what Aristotle called formal and final causes; it gives the organism a *telos,* "end," a kind of (nonfelt) goal. Organisms have ends, although not always ends-in-view.

All this cargo is carried by the DNA, essentially a *linguistic* molecule. By a serial "reading" of the DNA, a polypeptide chain is synthesized, such that its sequential structure determines the bioform into which it will fold. Ever-lengthening chains (like ever-longer sentences), are organized into genes (like paragraphs and chapters). Diverse proteins, lipids, carbohydrates, enzymes—all the life structures are "written into" the genetic library. The DNA is thus a *logical set,* not less than a biological set, informed as well as formed. Organisms use a sort of symbolic logic, use these molecular shapes as symbols of life. The novel resourcefulness lies in the epistemic content conserved, developed, and thrown forward to make biological resources out of the physicochemical sources. This executive steering core is cybernetic—partly a special kind of

cause and effect system, and partly something more: partly a historical information system discovering and evaluating ends so as to map and make a way through the world, partly a system of significances attached to operations, pursuits, resources. In this sense, the genome is a set of *conservation* molecules.

The genetic set is really a *propositional* set—to choose a provocative term—recalling how the Latin *propositum* is an assertion, a set task, a theme, a plan, a proposal, a project, as well as a cognitive statement. From this it is also a motivational set, unlike human books, since these life motifs are set to drive the movement from genotypic potential to phenotypic expression. Given a chance, these molecules seek organic self-expression. They thus proclaim a life way, and with this an organism, unlike an inert rock, claims the environment as source and sink, from which to abstract energy and materials and into which to excrete them. It "takes advantage" of its environment. Life thus arises out of earthen sources (as do rocks), but life turns back, on its sources to make resources out of them (unlike rocks). An acorn becomes an oak; the oak stands on its own.

So far we have only description. We begin to pass to value when we recognize that the genetic set is a *normative set;* it distinguishes between what *is* and what *ought to be.* This does not mean that the organism is a moral system, for there are no moral agents in nature; but the organism is an axiological, evaluative system. So the oak grows, reproduces, repairs its wounds, and resists death. The physical state that the organism seeks, idealized in its programmatic form, is a valued state. *Value* is present in this achievement. *Vital* seems a better word for it than *biological.* We are not dealing simply with an individual defending its solitary life but with an individual having situated fitness in an ecosystem. Still, we want to affirm that the living individual, taken as a "point experience" in the web of interconnected life, is *per se* an intrinsic value.

A life is defended for what it is in itself, without necessary further contributory reference, although, given the structure of all ecosystems, such lives necessarily do have further reference. The organism has something it is conserving, something for which it is standing: its life. Organisms have their own standards, fit into their niche though they must. They promote their own realization, at the same time that they track an environment. They have a technique, a know-how. Every organism has a *good-of-its-kind;* it defends its own kind as a *good kind.* In that sense, as soon as one knows what a giant sequoia tree is, one knows the biological identity that is sought and conserved. Man is neither the measurer nor the measure of things; value is not anthropogenic, it is biogenic.

There seems no reason why such own-standing normative organisms are not morally significant. A moral agent deciding his or her behavior, ought to take account of the consequences for other evaluative systems. This does not follow nature, if we mean by that to imitate ethical agents there, for nature is amoral. But it does follow nature, if we mean by that we respect these amoral organic norms as we shape our conduct. Such an ethic will be teleological, I suppose, since it values the *telos* in organisms, but it seems equally deontologi-

eal? since it owes (Gk: *deont-)* respect for life in itself, intrinsically, and not just instrumentally, consequentially. (Frankly, the classical teleological/deontological distinction seems as troublesome as helpful in moral analysis here.)

Within the community of moral agents one has not merely to ask whether *x* is a normative system, but, since the norms are a personal option, to judge the norm and the consequences. But within the biotic community organisms are amoral normative systems, and there are no cases where an organism seeks a good of its own that is morally reprehensible. The distinction between having a good of its kind and being a good kind vanishes, so far as any faulting of the organism is concerned. To this extent, everything with a good of its kind is a good kind and thereby has intrinsic value.

One might say that an organism is a bad organism if, during the course of pressing its normative expression, it upsets the ecosystem or causes widespread disease, bad consequences. Remember though, that an organism cannot be a good kind without situated environmental fitness. By natural selection the kind of goods to which it is genetically programmed must mesh with its ecosystemic role. Despite the ecosystem as a perpetual contest of goods in dialectic and exchange, it is difficult to say that any organism is a bad kind in this instrumental sense either. The misfits are extinct, or soon will be. In spontaneous nature any species that preys upon, parasitizes, competes with, or crowds another will be a bad kind from the narrow perspective of its victim or competitor.

But if we enlarge that perspective it typically becomes difficult to say that any species is a bad kind overall in the ecosystem. An "enemy" may even be good for the "victimized" species, though harmful to individual members of it, as when predation keeps the deer herd healthy. Beyond this, the "bad kinds" typically play useful roles in population control, in symbiotic relationships, or in providing opportunities for other species. The *Chlamydia* microbe is a bad kind from the perspective of the bighorns, but when one thing dies, something else lives. After the pinkeye outbreak, the golden eagle population in Yellowstone flourished, preying on the bighorn carcasses. For them *Chlamydia* is a good kind instrumentally.

Some biologist-philosophers will say that, even though an organism evolves to have a situated environmental fitness, not all such situations are good arrangements; some can be clumsy or bad. True, the vicissitudes of historical evolution do sometimes result in ecological webs that are suboptimal solutions, within the biologically limited possibilities and powers of interacting organisms. Still, such systems have been selected over millennia for functional stability; and at least the burden of proof is on a human evaluator to say why any natural kind is a bad kind and ought not to call forth admiring respect. Something may be a good kind intrinsically but a bad kind instrumentally in the system; these will be anomalous cases, however, with selection pressures against them. These claims about good kinds do not say that things are perfect kinds, or that there can be no better ones, only that natural kinds are good kinds until proven otherwise.

What is almost invariably meant by a "bad" kind is that an organism is instrumentally bad when judged from the viewpoint of human interests, of humane interests. "Bad" so used is an anthropocentric word; there is nothing at all biological or ecological about it, and so it has no force evaluating objective nature, however much humanist force it may sometimes have,

A really *vital* ethic respects all life, not just animal pains and pleasures, much less just human preferences. In the Rawahs, the old signs, "Leave the flowers for others to enjoy," were application signs using an old, ethically conservative, humanistic ethic. The new ones invite a change of reference frame—a wilder, more logical because more biological ethic, a radical ethic that goes down to the roots of life, that really is conservative because it understands biological conservation at depths, What the injunction, "Let the flowers live!" means is: "Daisies, marsh-marigolds, geraniums, larkspurs are evaluative systems that conserve goods of their kind, and, in the absence of evidence to the contrary, are good kinds. There are trails here by which you may enjoy these flowers. Is there any reason why your human interests should not also conserve these good kinds?" A drive-through sequoia causes no suffering; it is not cruel, but it is callous and insensitive to the wonder of life. The ethically conservative will complain that we have committed the naturalistic fallacy; rather, we invite a radical commitment to respect all life.

3. SPECIES

Certain rare species of butterflies occur in hummocks (slightly elevated forested ground) on the African grasslands. It was formerly the practice of unscrupulous collectors to go in, collect a few hundred specimens, and then burn out the hummock with the intention of destroying the species, thereby driving up the price of their collections. I find myself persuaded that they morally ought not do this. Nor will the reason resolve into the evil of greed, but it remains the needless destruction of a butterfly species.

This conviction remains even when the human goods are more worthy, Coloradans are considering whether to build the Two Forks Dam to supply urban Denver with water. This would require destroying a canyon and altering the Platte River flow, with many negative environmental consequences, including endangering a butterfly, the Pawnee montane skipper, *Hesperia leonardus montana,* as well as endangering the whooping crane downstream. I doubt whether the good of humans who wish more water for development, both for industry and for bluegrass lawns, warrants endangering species of butterflies and cranes.

Sometimes the stakes are alleged to rise even higher, The Bay checkerspot, *Euphydryas editha bayensis,* proposed to be listed as an endangered species, inhabits peripheral tracts of a large facility on which United Technologies Corporation, a missile contractor, builds and tests Minuteman and Tomahawk propulsion systems. The giant defense contractor has challenged the proposed listing and

thinks it airy and frivolous that a butterfly should slow the delivery of warhead missile propulsion systems, and so went ahead and dug a water pipeline through a butterfly patch. They operated out of the classical ethics that says that butterflies do not count but that the defense of humans does.

But a more radical, environmental ethics demurs. The good of humans might override the good of butterfly species but the case must be argued. Lest this seem the foolishness of a maverick philosopher, I point out that such conviction has been written into national law. The Endangered Species Act requires that the case must be argued before a high level "God" committee.

A species exists; a species ought to exist. Environmental ethics must make both claims and move from biology to ethics with care. Species exist only instantiated in individuals, yet are as real as individual plants or animals. The claim that there are specific forms of life historically maintained in their environments over time seems as certain as anything else we believe about the empirical world. At times biologists revise the theories and taxa with which they map these forms, but species are not so much like lines of latitude and longitude as like mountains and rivers, phenomena objectively there to be mapped. The edges of these natural kinds will sometimes be fuzzy, to some extent discretionary. One species will slide into another over evolutionary time. But it does not follow from the fact that speciation is sometimes in progress that species are merely made up, not found as evolutionary lines with identity in time as well as space.

A consideration of species is revealing and challenging because it offers a biologically based counterexample to the focus on individuals—typically sentient and usually persons—so characteristic in classical ethics. In an evolutionary ecosystem, it is not mere individuality that counts, but the species is also significant because it is a dynamic life form maintained over time. The individual represents (re-presents) a species in each new generation. It is a token of a type, and the type is more important than the token.

A species lacks moral agency, reflective self-awareness, sentience, or organic individuality. The older, conservative ethic will be tempted to say that specific-level processes cannot count morally. Duties must attach to singular lives, most evidently those with a psychological self, or some analogue to this. In an individual organism, the organs report to a center; the good of a whole is defended. The members of a species report to no center. A species has no self. It is not a bounded singular. There is no analogue to the nervous hookups or circulatory flows that characterize the organism.

But singularity, centeredness, selfhood, individuality, are not the only processes to which duty attaches. A more radically conservative ethic knows that having a biological identity reasserted genetically over time is as true of the species as of the individual. Identity need not attach solely to the centered organism; it can persist as a discrete pattern over time. Thinking this way, the life that the individual has is something passing through the individual as much as something it intrinsically possesses. The individual is subordinate to the species, not the other way around. The genetic set, in which is coded the

telos, is as evidently the property of the species as of the individual through which it passes. A consideration of species strains any ethic fixed on individual organisms, much less on sentience or persons. But the result can be biologically sounder, though it revises what was formerly thought logically permissible or ethically binding. This is a higher teleological ethic, finding now the specific *telos,* and concerned about consequences at that level; again, it is deontological, duty bound to the dynamic form of life for what it is in itself.

The species line is the *vital* living system, the whole, of which individual organisms are the essential parts. The species too has its integrity, its individuality, its "right to life" (if we must use the rhetoric of rights); and it is more important to protect this vitality than to protect individual integrity. The right to life, biologically speaking, is an adaptive fit that is right for life, that survives over millennia, and this generates at least a presumption that species in niche are good right where they are, and therefore that it is right for humans to let them be, to let them evolve.

Processes of value that we earlier found in an organic individual reappear at the specific level: defending a particular form of life, pursuing a pathway through the world, resisting death (extinction), regeneration maintaining a normative identity over time, creative resilience discovering survival skills. It is as logical to say that the individual is the species' way of propagating itself as to say that the embryo or egg is the individual's way of propagating itself. The dignity resides in the dynamic form; the individual inherits this, exemplifies it, and passes it on. If, at the specific level, these processes are just as evident, or even more so, what prevents duties arising at that level? The appropriate survival unit is the appropriate level of moral concern. This would be following nature specifically.

Sensitivity to this level, however, can sometimes make an environmental ethicist seem callous. On San Clemente Island, the U.S. Fish and Wildlife Service and the California Department of Fish and Game planned to shoot 2,000 feral goats to save three endangered plant species, *Malacothamnus clementinus, Castilleja grisea, Delphinium kinkiense,* of which the surviving individuals numbered only a few dozens. After a protest, some goats were trapped and relocated. But trapping all was impossible and many hundreds were killed. Is it inhumane to count plant species more than mammal lives, a few plants more than a thousand goats?

Those who wish to restore rare species of big cats to the wilds have asked about killing genetically inbred, inferior cats, presently held in zoos, in order to make space available for the cats needed to reconstruct and maintain a population genetically more likely to survive upon release. All the Siberian tigers in zoos in North America are descendants of seven animals; if these were replaced by others nearer to the wild type and with more genetic variability, the species could be saved in the wild. When we move to the level of species, we may kill individuals for the good of their kind.

Or we may now refuse to let nature take its course. The Yellowstone ethicists let the bison drown, callous to its suffering; they let the blinded bighorns

die. But in the spring of 1984 a sow grizzly and her three cubs walked across the ice of Yellowstone Lake to Frank Island, two miles from shore. They stayed several days to feast on two elk carcasses, when the ice bridge melted. Soon afterward, they were starving on an island too small to support them. This time the Yellowstone ethicists promptly rescued the grizzlies and released them on the mainland, in order to protect an endangered species. They were not rescuing individual bears so much as saving the species. They thought that humans had already and elsewhere imperiled the grizzly, and that they ought to save this form of life.

Humans have more understanding than ever of the natural world they inhabit, of the speciating processes, more predictive power to foresee the intended and unintended results of their actions, and more power to reverse the undesirable consequences. The duties that such power and vision generate no longer attach simply to individuals or persons but are emerging duties to specific forms of life. The wrong that humans are doing, or allowing to happen through carelessness, is stopping the historical vitality of life, the flow of natural kinds.

Every extinction is an incremental decay in this stopping life, no small thing. Every extinction is a kind of superkilling. It kills forms *(species),* beyond individuals. It kills "essences" beyond "existences," the "soul" as well as the "body." It kills collectively, not just distributively. It kills birth as well as death. Afterward nothing of that kind either lives or dies. A shutdown of the life stream is the most destructive event possible. Never before has this level of question—superkilling by a superkiller—been deliberately faced. What is ethically callous is the maelstrom of killing and insensitivity to forms of life and the sources producing them. What is required is principled responsibility to the biospheric earth.

Several billion years' worth of creative toil, several million species of teeming life, have been handed over to the care of this late-coming species in which mind has flowered and morals have emerged. Life on earth is a many splendored thing; extinction dims its luster. If, in this world of uncertain moral convictions, it makes any sense to claim that one ought not to kill individuals, without justification, it makes more sense to claim that one ought not to superkill the species, without superjustification. That moves from what *is* to what *ought to be;* and the fallacy is not committed by naturalists who so argue but by humanists who cannot draw these conclusions.

4 ECOSYSTEMS

"A thing is right," urged Aldo Leopold, concluding his land ethic, "when it tends to preserve the integrity, stability, and beauty of the biotic community; it is wrong when it tends otherwise." Again, we have two parts to the ethic: first that ecosystems exist, both in the wild and in support of culture; secondly that ecosystems ought to exist, both for what they are in themselves and as modi-

fied by culture. Again, we must move with care from the biological claims to the ethical claims.

Classical, humanistic ethics finds ecosystems unfamiliar territory. It is difficult to get the biology right, and, superimposed on the biology, to get the ethics right. Fortunately, it is often evident that human welfare depends on ecosystemic support, and in this sense all our legislation about clean air, clean water, soil conservation, national and state forest policy, pollution controls, oil spills, renewable resources, and so forth is concerned about ecosystem level processes. Further, humans find much of value for themselves in preserving wild ecosystems and our wilderness and park system is accordingly ecosystem oriented.

Still, a comprehensive environmental ethics needs the best, naturalistic reasons, as well as the good, humanistic ones, for respecting ecosystems. The ecosystem is the community of life; in it the fauna and flora, the species have entwined destinies. Ecosystems generate and support life, keep selection pressures high, enrich situated fitness, evolve congruent kinds in their places with sufficient containment. The ecologist finds that ecosystems are objectively satisfactory communities in the sense that organismic needs are sufficiently met for species long to survive, and the critical ethicist finds (in a subjective judgment matching the objective process) that such ecosystems are satisfactory communities to which to attach duty. Our concern must be for the fundamental unit of survival.

Giant forest fires raged over Yellowstone National Park in the summer of 1988, consuming nearly a million acres, despite the efforts of a thousand firefighters. By far the largest fires ever known in the park, the fires seemed a disaster. But the Yellowstone land ethic enjoins: Let nature take its course. Let it burn! So the fires were not fought at first, but in midsummer national authorities overrode that policy and ordered the fires put out. Even then, weeks later, fires continued to burn, partly because they were too big to control, but partly, too, because Yellowstone personnel did not altogether want the fires put out. Despite the evident destruction of trees, shrubs, and wildlife, they believe that fires are a good thing. Fires reset succession, release nutrients, recycle materials, renew the biotic community. (Nearby, in the Teton wilderness, a storm blew down 15,000 acres of trees, and some proposed that the area be declassified as wilderness for commercial salvage of the timber. But a similar environmental ethics said: No, let it rot.)

Aspen are important in the Yellowstone ecosystem. While some aspen stands are climax and self-renewing, many are seral and give way to conifers. Aspen groves support many birds and much wildlife, especially the beavers, whose activities maintain the riparian zones. Aspen are rejuvenated after fires, and the Yellowstone land ethic wants the aspen for its critical role in the biotic community. Elk browse the young aspen stems. To a degree this is a good thing, since it gives elk critical nitrogen, but in excess it is a bad thing. The elk have no predators, since the wolves are gone, and as a result they overpopulate. Excess elk also destroy the willows and this in turn destroys the beavers.

Rejuvenating the aspen might require managers to cull hundreds of elk—all for the sake of a healthy ecosystem.

The Yellowstone ethic wishes to restore wolves to the greater Yellowstone ecosystem. At the level of species, this is partly for what the wolf is in itself, but it is partly because the greater Yellowstone ecosystem does not have its full integrity, stability, and beauty without this majestic animal at the top of the trophic pyramid. Restoring the wolf as a top predator would mean suffering and death for many elk, but that would be a good thing for the aspen and willows, for the beavers and riparian habitat, with mixed benefits for the bighorns and mule deer, whose food the overpopulating elk consume, but who would also be consumed by the wolves. The Yellowstone ethic demands wolves, as it does fires, in appropriate respect for life in its ecosystem.

Letting nature take its ecosystemic course is why the Yellowstone ethic forbade rescuing the drowning bison, but rescued the sow grizzly with her cubs, the latter to insure that the big predators remain. After the bison drowned, coyotes and magpies, foxes and ravens fed on the carcass. Later, even a grizzly bear fed on it. All this is a good thing because the system cycles on. On that account rescuing the whales trapped in the winter ice seems less of a good thing, when we note that rescuers had to drive away polar bears that attempted to eat the dying whales.

An ecosystem, the conservative ethicist will say, is too low a level of organization to be respected intrinsically. Ecosystems can seem little more than random, statistical processes. A forest can seem a loose collection of externally related parts, the collection of fauna and flora a jumble, hardly a community. The plants and animals within an ecosystem have needs, but their interplay can seem simply a matter of distribution and abundance, birth rates and death rates, population densities, parasitism and predation, dispersion, checks and balances, stochastic process. Much is not organic at all (rain, groundwater, rocks, soil particles, air), while some organic material is dead and decaying debris (fallen trees, scat, humus). These things have no organized needs. There is only catch-as-catch-can scrimmage for nutrients and energy, a game played with loaded dice, not really enough integrated process to call the whole a community.

Unlike higher animals, ecosystems have no experiences; they do not and cannot care. Unlike plants, an ecosystem has no organized center, no genome. It does not defend itself against injury or death. Unlike a species, there is no ongoing *telos,* no biological identity reinstantiated over time. The organismic parts are more complex than the community whole. More troublesome still, an ecosystem can seem a jungle where the fittest survive, a place of contest and conflict, beside which the organism is a model of cooperation. In animals, the heart, liver, muscles and brain are tightly integrated, as are the leaves, cambium, and roots in plants. But the ecosystem community is pushing and shoving between rivals, each aggrandizing itself, or else indifference and haphazard juxtaposition, nothing to call forth our admiration.

Environmental ethics must break through the boundary posted by disoriented ontological conservatives, who hold that only organisms are "real,"

actually existing as entities, whereas ecosystems are nominal—just interacting individuals. Oak trees are real but forests are nothing but collections of trees. But any level is real if it shapes behavior on the level below it. Thus the cell is real because that pattern shapes the behavior of amino acids; the organism because that pattern coordinates the behavior of hearts and lungs. The biotic community is real because the niche shapes the morphology of the oak trees within it. Being real at the level of community only requires an organization that shapes the behavior of its members.

The challenge is to find a clear model of community and to discover an ethics for it—better biology for better ethics. Even before the rise of ecology, biologists began to conclude that the combative survival of the fittest distorts the truth. The more perceptive model is coaction in adapted fit. Predator and prey, parasite and host, grazer and grazed are contending forces in dynamic process where the well-being of each is bound up with the other—coordinated (orders that couple together) as much as heart and liver are coordinated organically. The ecosystem supplies the coordinates through which each organism moves, outside which the species cannot really be located. A species is what it is where it is.

The community connections are looser than the organism's internal interconnections—but not less significant. Admiring organic unity in organisms and stumbling over environmental looseness is like valuing mountains and despising valleys. The matrix the organism requires in order to survive is the open, pluralistic ecology. Internal complexity—heart, liver, muscles, brain—arises as a way of dealing with a complex, tricky environment The skin-out processes are not just the support, they are the subtle source of the skin-in processes. In the complete picture, the outside is as *vital* as the inside. Had there been either simplicity or lock-step concentrated unity in the environment, no organismic unity could have evolved. Nor would it remain. There would be less elegance in life.

To look at one level for what is appropriate at another makes a categorical mistake. One should not look for a single center or program in ecosystems, much less for subjective experiences. Instead, one should look for a matrix, for interconnections between centers (individual plants and animals, dynamic lines of speciation), for creative stimulus and open-ended potential. Everything will be connected to many other things, sometimes by obligate associations, more often by partial and pliable dependencies and, among other things, there will be no significant interactions. There will be functions in a communal sense: shunts and criss-crossing pathways, cybernetic subsystems, and feedback loops. An order arises spontaneously and systematically when many self-concerned units jostle and seek their own programs, each doing their own thing and forced into informed interaction.

An ecosystem is a productive, projective system. Organisms defend only their selves, with individuals defending their continuing survival and species increasing the numbers of kinds. But the evolutionary ecosystem spins a bigger story, limiting each kind, locking it into the welfare of others, promoting

new arrivals, bringing forth kinds and the integration of kinds. Species *increase their kind;* but ecosystems *increase kinds,* superimposing the latter increase onto the former. *Ecosystems are selective systems, as surely as organisms are selective systems.* The natural selection comes out of the system and is imposed on the individual. The individual is programmed to make more of its kind, but more is going on systemically than that; the system is making more kinds.

This extends natural selection theory beyond the merely tautological formulation that the system selects the best adapted to survive. Ecosystems select for those features that appear over the long ranges, for individuality, for diversification, for sufficient containment, for quality supervening on quantity of life. They do this, appropriately to the community level, by employing conflict, decenteredness, probability, succession, spontaneous generation of order, and historicity. Communal processes—the competition between organisms, more or less probable events, plant and animal successions, speciation over historical time—generate an ever-richer community.

Hence the evolutionary toil, elaborating and diversifying the biota, that once began with no species and results today in five million species, increasing over time the quality of lives in the upper rungs of the tropic pyramids. One-celled organisms evolved into many-celled, highly integrated organisms. Photosynthesis evolved and came to support locomotion—swimming, walking, running, flight. Stimulus-response mechanisms became complex instinctive acts. Warm-blooded animals followed cold-blooded ones. Complex nervous systems, conditioned behavior and learning emerged. Sentience appeared—sight, hearing, smell, tastes, pleasure, pain. Brains coupled with hands. Consciousness and self-consciousness arose. Culture was superimposed on nature.

These developments do not take place in all ecosystems or at every level. Microbes, plants, and lower animals remain, good of their kinds, and serving continuing roles, good for other kinds. The understories remain occupied. As a result, the quantity of life and its diverse qualities continue—from protozoans to primates to people. There is a push-up, lock-up, ratchet effect that conserves the upstrokes and the outreaches. The later we go in time the more accelerated are the forms at the top of the tropic pyramids, the more elaborated are the multiple tropic pyramids of earth. There are upward arrows over evolutionary time.

The system is a game with loaded dice, but the loading is a prolife tendency, not mere stochastic process. Though there is no *nature* in the singular, the system has a nature, a loading that pluralizes, putting *natures* into diverse kinds, nature_1, nature_2, nature_3 … nature_n. It does so using random elements (in both organisms and communities), but this is a secret of its fertility, producing steadily intensified interdependencies and options. An ecosystem has no head, but it has a "heading" for species diversification, support, and richness. Though not a superorganism, it is a kind of vital field.

Instrumental value uses something as a means to an end; *intrinsic value* is worthwhile in itself. No warbler eats insects to become food for a falcon; the warbler defends its own life as an end in itself and makes more warblers as it

can. A life is defended intrinsically, without further contributory reference. But neither of these traditional terms is satisfactory at the level of the ecosystem, Though it has value *in* itself, the system does not have any value *for* itself. Though a value producer, it is not a value owner. We are no longer confronting instrumental value, as though the system were of value instrumentally as a fountain of life. Nor is the question one of intrinsic value, as though the system defended some unified form of life for itself. We have reached something for which we need a third term: *systemic value.* Duties arise in an encounter with the system that projects and protects these member components in biotic community. If you like, that is an ethic that is teleological again, but since we are respecting both processes and products, perhaps a better word for it now is communitarian. We follow nature, this time ecologically.

Ethical conservatives, in the humanist sense, will say that ecosystems are of value only because they contribute to human experiences. But that mistakes the last chapter for the whole story, one fruit for the whole plant. Humans count enough to have the right to flourish there, but not so much that they have the right to degrade or shut down ecosystems, not at least without a burden of proof that there is an overriding cultural gain. Earlier, environmental ethics will say that ecosystems are of value because they contribute to animal experiences or to organismic life. Later, the deeper, more conservative and more radical view sees that the stability, integrity, and beauty of biotic communities are what are most fundamentally to be conserved.

5. VALUE THEORY

In practice the ultimate challenge of environmental ethics is the conservation of life on earth. In principle the ultimate challenge is a value theory profound enough to support that ethic. We need an account of how nature carries value, and an ethics that appropriately respects those values. For subjectivists both the theory and the ethics will be nothing but human constructs; but objectivists in environmental ethics will use such theory to discover facts, how nature carries values, and from this sometimes there will follow what humans ought to do. The values that nature carries belong as much to the biology of natural history as to the psychology of human experience. Some of the values that nature carries are up to us, our assignment. But fundamentally there are powers in nature that move to us and through us. The splendors of earth do not simply lie in their roles as human resources, supports of culture, or stimulators of experience.

There is no value without an evaluator. So runs a well-entrenched dogma. Humans clearly evaluate their world; sentient animals may also. But plants cannot evaluate their environment; they have no options and make no choices. *A fortiori,* species and ecosystems, earth and nature cannot be bona fide evaluators. Value, like a tickle or remorse, must be felt to be there. Its *esse* is *percipi.* Nonsensed value is nonsense. There are no thoughts without a thinker, no per-

cepts without a perceiver, no deeds without a doer, no targets without an aimer. Valuing is felt preferring; value is the product of this process,

If value arrives only with consciousness, experiences where humans find value there have to be dealt with as appearances of various sorts. The value has to be relocated in the valuing subject's creativity as a person meets a valueless world, or even a valuable one—one *able* to be *valued*—but which before the human bringing of value ability contains only possibility and not any actual value. Value can only be extrinsic to nature, never intrinsic to it. Nature offers but the standing possibility of valuation; value is not generated until humans appear with their valuing ability.

But the valuing subject in an otherwise valueless world is an insufficient premise for the experienced conclusions of those who respect all life. Conversion to a biological view seems truer to world experience and more logically compelling. Here the order of knowing reverses—and also enhances—the order of being. This, too, is a perspective, but ecologically better informed. Science has been steadily showing how the consequents (life, mind) are built on their precedents (energy, matter), however much they overleap them. Life and mind appear where they did not before exist, and with this levels of value emerge that did not before exist. But that gives no reason to say that all value is an irreducible emergent at the human (or upper animal) level. Nature does, of course, offer possibilities for human valuation, but the vitality of the system is not something that goes on in the human mind, nor is its value. The possibility of valuation is carried to us by evolutionary and ecological natural history, and such nature is already valuable before humans arrive to evaluate what is taking place.

How do we humans come to be charged up with values, if there was and is nothing in nature charging us up so? Some value is anthropogenic, generated by humans, but some is biogenie, in the natural genesis. A comprehensive environmental ethics reallocates value across the whole continuum. Value increases in the emergent climax, but is continuously present in the composing precedents. The system is *value-able, able* to produce *value.* Human evaluators are among its products. But when we value we must not forget our communal bonds. Sometimes we need to evaluate (appraise the worth of) what we ourselves may not value (personally prefer). Against the standard view that all value requires a beholder, some value requires only a holder, and some value is held within the historic system that carries value to and through individuals.

Here we do not want a subjective morality but an objective one, even though we find that subjectivity is the most valuable output of the objective system. Is there any reason for ethical subjects to discount the vital systemic processes unless and until accompanied by sentience? Perhaps to evaluate the entire biological world on the basis of sentience is as much a categorical mistake as to judge it according to whether justice and charity are found there. The one mistake judges biological places by extension from psychology, the other from culture. What is "right" about the biological world is not just the

production of pleasures and positive experiences. What is "right" includes ecosystemic patterns, organisms in their generating, sustaining environments.

Some value depends on subjectivity, yet all value is generated within the geosystemic and ecosystemic community. Systemically, value fades from subjective to objective value, but also fans out from the individual to its role and matrix. Things do not have their separate natures merely in and for themselves, but they face outward and co-fit into broader natures. Value-in-itself is smeared out to become value-in-togetherness. Value seeps out into the system, and we lose our capacity to identify the individual as the sole locus of value.

Intrinsic value, that of an individual "for what it is in itself," becomes problematic in a holistic web. True, the system produces such values more and more with its evolution of individuality and freedom. Yet to decouple this from the biotic, communal system is to make value too internal and elementary; this forgets relatedness and externality. Every intrinsic value has leading and trailing *ands* pointing to value from which it comes and toward which it moves. Adapted fitness makes individualistic value too system independent. Intrinsic value is a part in a whole, not to be fragmented by valuing it in isolation. An isolated *telos* is biologically impossible; the ethic cannot be teleological in that sense, nor can we term it deontological either, if this requires respect for an intrinsic value regardless of ecosystemic consequences. (The classical distinction fails again.)

Everything is good in a role, in a whole, although we can speak of objective intrinsic goodness wherever a good kind defends itself. We can speak of subjective intrinsic goodness when such an event registers as a point experience, at which point humans pronounce both their experience and what it is of good without need to enlarge their focus. The system is a value transformer where form and being, process and reality, fact and value are inseparably joined. Intrinsic and instrumental values shuttle back and forth, parts-in-wholes and wholes-in-parts, local details of value embedded in global structures, gems in their settings, and their setting-situation a corporation where value cannot stand alone. Every good is in community.

This is what is radically wrong with anthropocentric or merely anthropogenic value. It arrogates to humans what permeates the community. Subjective self-satisfactions are, and ought to be, sufficiently contained within the objectively satisfactory system. The system creates life, selects for adaptive fit, constructs increasingly richer life in quantity and quality, supports myriads of species, escalates individually, autonomy, and even subjectivity, within the limits of decentralized community. When persons appraise this natural history, if such land is not a valuable, satisfactory biotic community, why not? Does earth and its community of life not claim their concern and care?

In environmental ethics one's beliefs about nature, which are based upon but exceed science, have everything to do with beliefs about duty. The way the world *is* informs the way it *ought* to be. We always shape our values in significant measure in accord with our notion of the kind of universe that we live in, and this drives our sense of duty. Our model of reality implies a model of con-

duct. Perhaps we can leave open what metaphysics ultimately underlies our cosmos, but for an environmental ethics at least we will need an earthbound metaphysics, a metaecology. Differing models sometimes imply similar conduct, but often they do not. A model in which nature has no value apart from human preferences will imply different conduct from one where nature projects fundamental values, some objective and others that further require human subjectivity superposed on objective nature.

This evaluation is not scientific description; hence not ecology *per se*, but we do move to metaecology. No amount of research can verify that, environmentally, the right is the optimum biotic community. Yet ecological description generates this valuing of nature, endorsing the systemic rightness. The transition from *is* to *good* and thence to *ought* occurs here; we leave science to enter the domain of evaluation, from which an ethic follows.

What is ethically puzzling and exciting is that an *ought* is not so much *derived* from an *is* as discovered simultaneously with it. As we progress from descriptions of fauna and flora, of cycles and pyramids, of autotrophs coordinated with heterotrophs, of stability and dynamism, on to intricacy, planetary opulence and interdependence, to unity and harmony with oppositions in counterpoint and synthesis, organisms evolved within and satisfactorily fitting their communities, arriving at length of beauty and goodness, it is difficult to say where the natural facts leave off and where the natural values appear. For some at least, the sharp *is/ought* dichotomy is gone; the values seem to be there as soon as the facts are fully in, and both alike properties of the system. This conviction, and the conscience that follows from it, can yield our best adaptive fit on earth.